Supplementary material
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Magnetocarcinogenesis: is there a mechanism for carcinogenic effects of weak magnetic fields?

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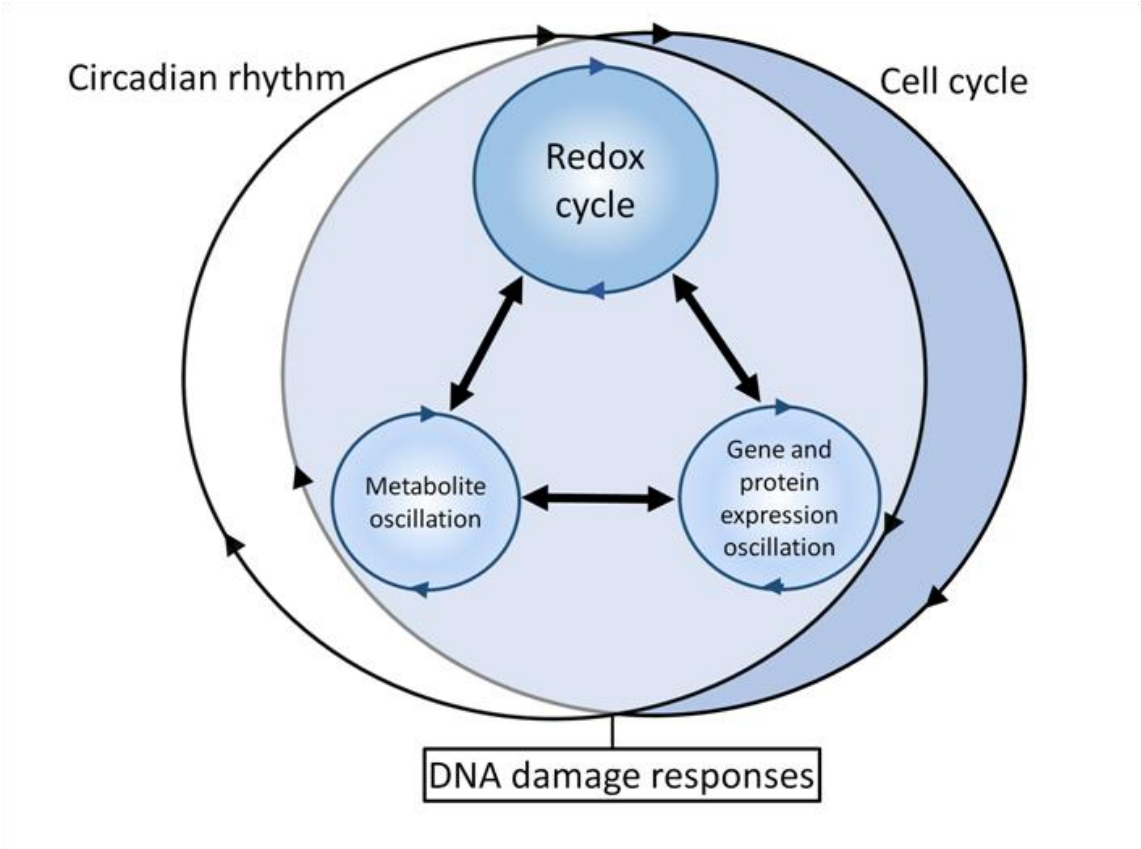
Figure S1. The circadian clock is intertwined with the cell cycle in vivo, and controls cellular responses to environmental stimuli including responses to DNA damage and oxidative stress [Sancar et al., 2010; Wilking et al., 2013]. The circadian rhythms are linked to other biological oscillations, including ones with shorter (ultradian) time scales, such as oscillations in gene and protein expression, metabolite oscillations, and the redox cycle, which may have a fundamental role in biological timekeeping [Lloyd and Murray, 2007; Mellor, 2016].



References

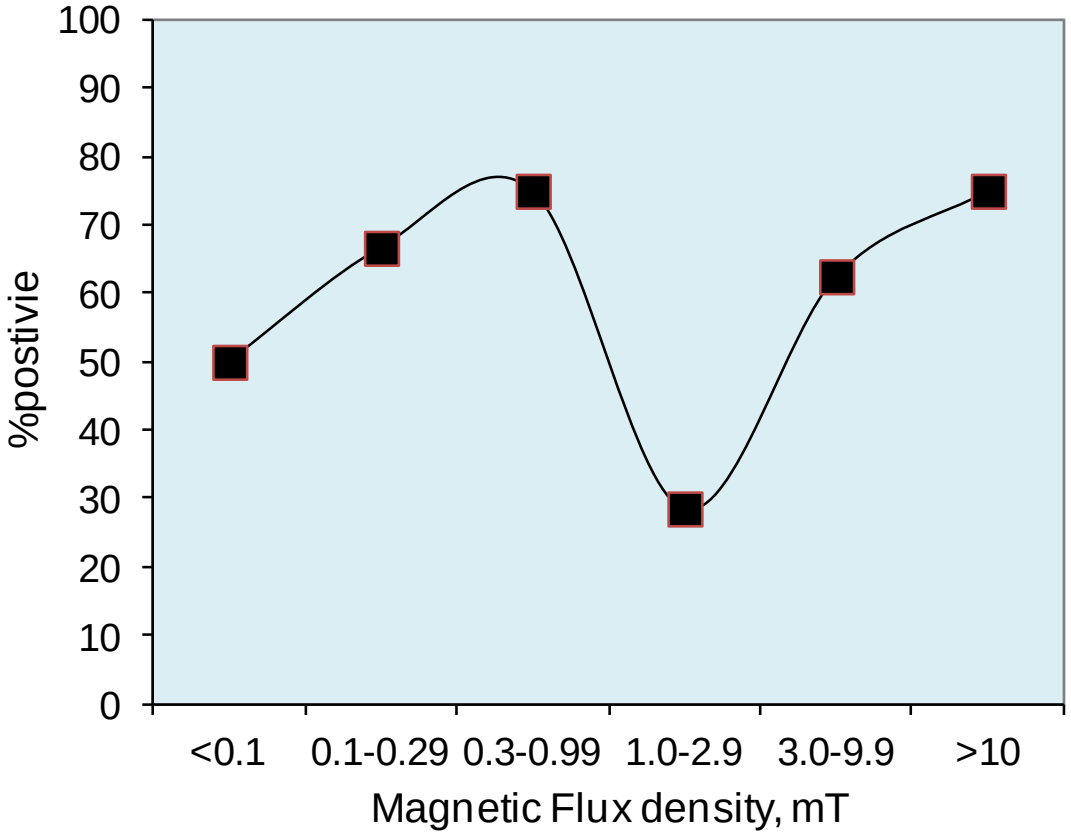
Lloyd D, Murray DB. 2007 Redox rhythmicity: clocks at the core of temporal coherence. *Bioessays* **29**, 465-473. (doi:10.1002/bies.20575)

Mellor J. 2016 The molecular basis of metabolic cycles and their relationship to circadian rhythms. *Nat. Struct. Mol. Biol*. **23**, 1035-1044. (doi:10.1038/nsmb.3311)

Sancar A, Lindsey-Boltz LA, Kang TH, Reardon JT, Lee JH, Ozturk N. 2010 Circadian clock control of the cellular response to DNA damage. *FEBS Lett*. **584**, 2618-2625. (doi:10.1016/j.febslet.2010.03.017)

Wilking M, Ndiaye M, Mukhtar H, Ahmad N. 2013 Circadian rhythm connections to oxidative stress: implications for human health. *Antioxid. Redox Signal*. **19**, 192-208. (doi:10.1089/ars.2012.4889)

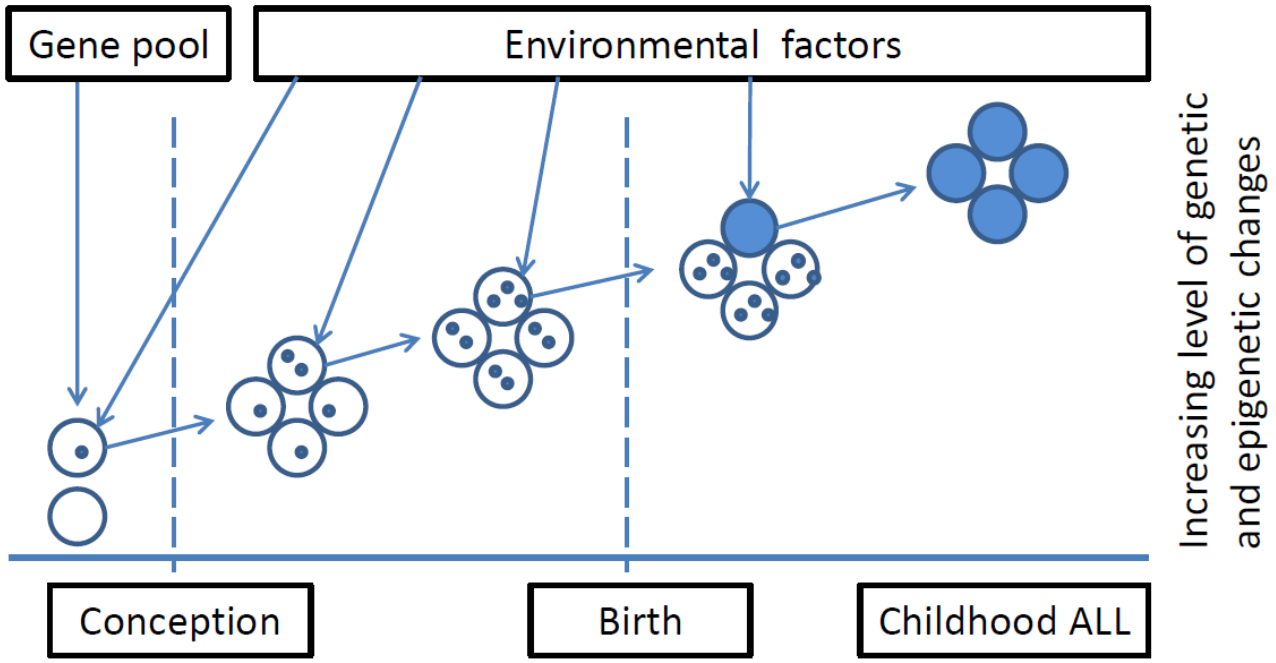
Figure S2. Modifying effects of 50 – 60 Hz magnetic fields on the genotoxicity of other chemical or physical agents: proportion of positive studies by magnetic flux density. Any modifying effect was considered as "positive" in this analysis. Redrawn based on data in Juutilainen et al. [2006].



Reference

Juutilainen J, Kumlin T, Naarala J. 2006 Do extremely low frequency magnetic fields enhance the effects of environmental carcinogens? A meta-analysis of experimental studies. *Int. J. Radiat. Biol.* **82**, 1-12. (doi:10.1080/09553000600577839)

Figure S3. Factors involved in the development of childhood acute lymphoblastic leukaemia (ALL). According to current models [Eden, 2010], childhood leukaemia generally has a prenatal origin, but overt leukaemia develops in only a minority of children after further postnatal "hits", and a combination of various factors appears to be necessary to induce the disease. Small circles denote relevant genetic and epigenetic changes, and large open and closed circles represent non-cancerous and cancerous cells.



Reference

Eden T. 2010 Aetiology of childhood leukaemia. *Cancer Treat. Rev.* **36**, 286-297. (doi:10.1016/j.ctrv.2010.02.004)